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Comparison of Two Health-Promotion Programs for Older Workers

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Abstract

Objectives—We examined the effects of 2 worksite health-promotion interventions (compared with a health-education control) on older workers' healthy behaviors and health outcomes.

Methods—We conducted a prospective, randomized controlled trial with 423 participants aged 40 years and older. Participants were categorized into 3 study arms: the COACH intervention combined Web-based risk assessments with personal coaching support, the RealAge intervention used a Web-based risk assessment and behavior-specific modules, and a control group received printed health-promotion materials. Participants were assessed at baseline, 6 months, and 12 months. Random-effects modeling controlled for baseline stage of change for all behaviors of interest in all groups.

Results—At 6 and 12 months, COACH participants showed significantly increased fruit and vegetable consumption ($P = .026$; $P < .001$) and participation in physical activity ($P = .05$; $P = .013$), and at 12 months they showed decreased percentage of energy from fat ($P = .027$). RealAge participants showed significantly decreased waist circumference at 6 and 12 months ($P = .05$; $P = .018$).

Conclusions—COACH participants were twice as likely to use the COACH intervention as RealAge participants were to use the RealAge intervention. COACH participants experienced twice the number of positive outcomes that control participants experienced.

US labor force participation for individuals aged 55 years and older rose sharply between 2000 and 2005 (by 4.7%) and has continued to grow during the current recession.[1,2] As a result of the aging baby-boomer cohort, the number of workers older than 55 years is expected to increase from 19.2 million in 2002 to 31.8 million by 2015.[3] The percentage of workers older than 55 years is expected to increase from 14% to almost 30% during the same time period.[3] Although older workers bring several beneficial traits to theworkplace,

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data suggest that they may be at risk for greater health care use and cost as a result of the presence of potentially untreated chronic-disease risk factors.[4] Absenteeism attributable to illness is also higher among older workers than among their younger counterparts.[5] Given the projected increases in the number of older workers, the development and testing of effective health-promotion interventions for this population is an urgent national priority.

A number of studies have examined the effectiveness of workplace health programs.[6] A systematic literature review undertaken in 2007 by the Task Force on Community Preventive Services identified 50 studies that met their workplace health-promotion guidelines and reported health and productivity outcomes.[7] Despite the amount of literature on this topic, gaps still exist. A potentially critical factor that has not been addressed is age. The majority of participants in interventions tested to date include adults of all ages.[8–11] Most published reports do not report specific effectiveness for older workers,[7-9] and many do not report any information on the age range of the sample studied.[7,8,10]

We identified 2 studies of workplace health programs that focused on older adults. Fries et al. conducted a randomized trial of a health-promotion program with retirees; the program used a mailed risk appraisal, recommendation letters, and self-management materials. Findings included significantly reduced health risks and participant costs.[12] While these findings were promising, they may not be generalizable to older persons still in the workforce. A second study used a matched comparison design to evaluate a similar intervention with active employees and retirees. Among employees, the intervention reduced health care costs and risk-factor prevalence.[13] However, the use of a matched comparison group raises questions about possible selection bias. In the current study, we sought to address these issues by using a randomized trial to test how effectively 2 health behavior change programs motivated older workers to participate in healthy behaviors.

The first intervention, COACH, is based on the EnhanceWellness program. Enhance-Wellness was tested on older adult users of community-based senior centers[14] but has not been tested with younger, working-age older adults. The second intervention—the Web-based RealAge program (http://www.realage.com)—addresses multiple chronic conditions that are highly prevalent among older workers. Although RealAge has been broadly disseminated, to our knowledge it has never been evaluated in a randomized trial. Both interventions use Web sites to administer standardized risk assessments, develop risk appraisals, and give participants a set of choices with respect to action plans for health-related behavior change. By contrast, EnhanceWellness combines a computer interface with individualized counseling; thus, it is a combined “high tech/high touch” approach, whereas RealAge is a totally Web-based intervention.

To date, the comparative effectiveness of these 2 approaches and their comparative appeal to workers have not been tested. To fill these knowledge gaps, we tested the effect of each program on levels of participation in health behaviors, and we compared the programs’ effects to the effects seen with a control group that received a light level of health education.

METHODS

We used a single-site, prospective, randomized controlled trial with multiple posttests to examine the effects of 2 interventions—compared with a light health education control group—on self-reported participation in healthy behaviors related to diet, physical activity (PA), stress, and smoking. We also assessed the 3 study arms for the objective indicators of weight, body mass index (BMI; defined as weight in kilograms divided by height in meters squared), and waist circumference. In the analyses, each self-reported behavior was adjusted for the participant’s baseline stage of change (SOC) for that behavior. Neither participants

nor researchers were blinded to study group. Research participants were older support and academic staff at the University of Illinois at Chicago. We targeted the interventions to staff because we thought that staff would have greater need for the interventions and would show greater benefit than faculty. We expected faculty to have less need for the interventions because of their higher levels of education. Participants were recruited via announcements on staff listservs, targeted e-mails, staffed recruitment tables at events in highly trafficked buildings, and flyers posted throughout the university.

Measures were obtained in face-to-face interviews at baseline, 6 months after baseline, and 12 months after baseline. All study participants came to the research office to complete a baseline survey, at which time they were assigned to one of the 3 study groups. We determined randomization sequences by using our own custom software, which is designed to achieve balanced allocation of cases to conditions stratified by education (completed high school or better, less than high school graduate) and race/ethnicity (White/Asian/Native American/Alaska Native/other, Hispanic, African American). The interventions were offered at no charge to participants.

Study Groups

COACH—The original EnhanceWellness Program used a nurse—social worker team to review risk assessments with participants, develop an action plan, refer participants to appropriate programs, and revise the action plan as needed until maintenance was achieved. We thought a team approach might not be generalizable in worksites, so instead we used a single MPH-educated coach trained in principles of behavior change and motivational interviewing. We named this adapted version of EnhanceWellness the COACH program because we thought that name would have greater appeal to a working-age population.

The coach contacted participants to schedule and conduct an initial in-person Enhance-Wellness health-risk assessment, review the participant's health-risk profile, discuss behaviors the participant was interested in adopting, and discuss the availability of health behavior change programs on or off campus. The coach reviewed the participant's health-related goals and negotiated an action plan to meet those goals. The plan could be revised and expanded over time. During the first week after the assessment, the coach called participants by phone to ask them about their success in accessing resources needed to implement the plan. Participants who reported difficulty returned for a second meeting to revise the plan to reflect attainable goals. Thereafter, the coach contacted participants via e-mail or telephone biweekly during months 1 through 6 and monthly during months 7 through 12. During these contacts, the coach and participant reevaluated the plan, including the negotiation of other goals and related actions. The coach repeated the in-person assessment with participants at 6 and 12 months (and more frequently if needed).

RealAge—Participants assigned to the Real Age group were sent an e-mail message to remind them to access a Web page set up by RealAge staff for use in this trial. The Web site contained the RealAge test, which participants were instructed to complete. The e-mail gave participants the login information needed to access the Web site and complete the test, which reviewed family history, diet and nutrition, PA, tobacco and alcohol use, satisfaction with family relationships, and use of preventive health care. After participants completed the test, the Web site generated individual risk profiles and indicated areas that could be worked on to improve health. Participants used the Web site to select behaviors to work on and create plans to meet behavioral goals. The RealAge site tracked each time a participant used it, and the site forwarded this information to the study team at regular intervals, enabling us to document use.

Control—After the baseline interview and random study-arm assignment, participants in the light health education control group were personally handed printed health-promotion materials. These materials included a listing of health-promotion programs and services offered by the university and other community-based organizations.

Individuals younger than 40 years and faculty were excluded from the research. We originally set the minimum age at 50 years, but we lowered it to 40 years to boost recruitment. Participants were also required to have reliable access to the Internet at home or work.

We used methods outlined by Rochon[15] to estimate ideal sample size. Under a wide variety of assumptions regarding attrition and covariance structures (e.g., AR-1 correlations varying from 0.4 to 0.7 and attrition varying from 10% to 30%), we found that a sample size of 150 in each of the 3 conditions (450 total) would enable us to detect between-group end-point differences of one quarter of a standard deviation, assuming 1-tailed tests and power of 0.8.

The primary independent variable was intervention assignment. Demographic variables were age, race/ethnicity, gender, income, type of health insurance coverage, educational attainment, job description, job title and department, and length of employment at the university. We used a self-report measure of comorbid conditions.[16]

We used SOC for specific health behaviors as a moderator in the outcome analyses. The transtheoretical model of behavior change states that persons who are in contemplation of or preparation for the adoption of a health behavior are more likely to actively engage in the behavior, at least in the short term. We used algorithms to classify individuals into stages of change at baseline on the basis of this model.[1,17-19] Participants were labeled as being in precontemplation, contemplation, preparation, action, or maintenance SOC for healthy eating,[20] dietary fat reduction,[21] fruit and vegetable intake,[22] PA, vigorous exercise,[23] moderate exercise,[23] and smoking cessation,[24] according to customary SOC criteria that were based on duration of participation in each specified behavior. For example, persons classified as maintainers had to engage in the behavior most days of the week and had to have been engaged at that level for longer than 6 months. The dietary SOC measures were significantly intercorrelated. Therefore, we selected a single indicator—SOC for healthy eating—as the moderator because the items in this scale appeared to be more global in nature. To assess SOC for stress management we used a question developed by the authors.

Outcome Measures

Dietary behaviors—We measured changes in percent energy from fat and in fruit and vegetable intake from baseline to 6 months and 12 months. We used the National Cancer Institute's Percentage Energy from Fat Screener questionnaire to assess participants' usual daily intake of fat.[25] We used the National Cancer Institute All-Day Fruit and Vegetable Screener questionnaire to obtain self-reported data on fruit and vegetable intake during a typical day.[26]

Physical activity—We assessed changes in vigorous activity, moderate activity, and level of exercise participation from baseline to 6 months and 12 months. We used the 7-item Behavioral Risk Factor Surveillance System scale to assess vigorous and moderate PA over a typical week,[27] and we used the Rapid Assessment of Physical Activity to assign participants to 1 of 5 categories of exercise participation.[28]

Stress—We investigated change from baseline to 6 months and 12 months in 4 measures of stress. We used the Perceived Stress Scale[29] to measure overall stress during the preceding month. We used a 4-item scale developed by Lorig et al.[30] to assess health-related

stress, and we used the Brief COPE[31] to assess use of positive and negative coping behaviors.

Smoking—Smoking cessation was defined as a minimum of 6 months of total abstinence from tobacco use at 6 months and 12 months after baseline, among participants who were current smokers at baseline or 6 months. We used a 3-item measure of past and current smoking status from the Behavioral Risk Factor Surveillance System to assess tobacco use.[25]

Body mass index, waist circumference, and weight—Staff measured participants' height without shoes (rounding to the nearest eighth of an inch) and weight without coat or shoes (rounding to the nearest pound), and we used this information to calculate BMI.[32] Research staff used a tape measure to measure waist circumference. For all 3 measures we assessed change from baseline at 6 months and 12 months.

Recruitment and Enrollment

Recruitment and enrollment of participants began in February 2006 and ended in July 2007. We used a broad array of recruitment strategies, including conducting recruitment events at locations frequently visited by our target population, mass e-mails, and campus listservs that sent biweekly messages to staff. This outreach generated 647 inquiries about study enrollment. Of these inquiries, 66% were deemed eligible, 15% were deemed ineligible, 14% refused study participation, and 3% never returned screening phone calls. Of 94 persons who refused, 57 were not interested, 23 did not have enough time, 11 refused for unknown reasons, 2 indicated medical reasons, and 1 person indicated that the research office was too far away. Of the sample of 423 study participants enrolled at baseline, 150 were assigned to the COACH arm, 135 were assigned to the RealAge arm, and 138 were assigned to the control group.

Retention and Attrition

Figure 1 depicts the clinical flow of the interventions and reports the number of participants in each group who participated in measurement at each time point. Of the 423 participants at baseline, 85% completed 6-month interviews, 4% withdrew before the 6-month interview, and 11% did not respond to requests to complete the 6-month interview within the prescribed time window. Retention rates by group were 85% for COACH, 81% for RealAge, and 88% for the control group (Figure 1). Of the 405 participants eligible for 12-month interviews, 90.4% completed them, 3.2% withdrew after their 6-month interview, and 6.4% did not respond within their interview window. The overall retention rate at 12 months was 86.8%; broken down by group, the retention rates were 91% for COACH, 84% for RealAge, and 84% for the control group.

We used a logistic-regression model to compare those who remained in the study to those who left (nonresponders).[33] We regressed a variable indicating continued participation in the study on the baseline values of each outcome variable, a dummy variable for group assignment, and the interaction of the 2 variables. These analyses revealed no significant differences between responders and nonresponders on any demographic or outcome measures.

Outcome Analyses

We modeled data by means of mixed-effects regression models with an exchangeable error structure.[33] The design involved 2 between-subjects variables (group assignment and SOC) and 1 within-subject variable (time). Group assignment was represented by 2 indicator variables for COACH and RealAge, with the control as the reference group. Time was

treated non-linearly by including indicator variables for 6 months and 12 months relative to baseline. We dichotomized SOC to indicate precontemplation, contemplation, or preparation (coded 1) versus action or maintenance (coded 0). Participants varied at baseline on SOC with regard to the various health behaviors; thus, a given respondent might be coded differently on SOC for different outcomes. Using SOC in this way allowed us to see whether the interventions increased levels of participation in health behaviors among participants who had not achieved action or maintenance for a given behavior at baseline.

We estimated saturated models including main effects for group, time, and SOC, along with all 2-way and 3-way interactions. The 2-way interactions between group and time allowed us to determine whether patterns of change over time varied by group. The 3-way interactions allowed us to assess whether differences over time between groups varied by SOC level. We used the natural log of minutes of moderate and vigorous PA to deal with the skewed distributions of those outcomes. Finally, we used 1-tailed tests of significance because 7 prior studies of similar interventions had shown positive effects, leading us to believe that if we were to find an effect, it would be in a positive direction.[8-14] Accordingly, we chose a directional hypothesis at the conventional .05 significance level, which enabled us to detect either a null effect or a positive effect.

RESULTS

The mean age of participants across the 3 study arms (n = 423) was 51 years, with a range of 40 to 68 years (not shown). A majority of participants (82%) were female, and a majority (62%) were from racial/ethnic minority groups (45% African American, 11% Hispanic, 4% Asian, 1% American Indian/Alaska Native, 1% other; Table A, available as a supplement to the online version of this article at http://www.ajph.org). For education, 8% had completed high school only, 34% had completed 1 to 3 years of college, and 57% had received a college degree. The mean length of employment at the university was 12.6 years, and 20% of participants worked in senior management, 26% were professionals, 44% worked in clerical or administrative support, and 8% worked in service, craft, or laborer positions. Study participants represented approximately 14% of support staff at the university. Compared with all support staff, study participants had a higher proportion of females (82% vs 68%) and Whites (42% vs 34%) but a similar proportion of African Americans (45% vs 43%).

Roughly 50% of participants reported having at least 1 chronic condition. At baseline, 21% of participants had a normal BMI (< 25), 32% were overweight (25–< 30), and 46% were obese ([greater than or equal to]30). There were no significant differences on any of the demographic, occupational, or disease variables between groups at baseline.

At baseline, 44% of participants were in precontemplation, contemplation, or preparation SOC with respect to PA (data not shown), 42% were in the same stages with respect to fat consumption, and 100% were in the same stages for fruit and vegetable consumption.

At baseline, 37% of participants were in precontemplation, contemplation, or preparation for stress management. The total number of participants at baseline who had ever smoked was 174; 53 of those were current smokers and were in precontemplation, contemplation, or preparation for cessation. The remaining 121 ever smokers were former smokers, of whom 110 were in maintenance, having quit more than 6 months ago. We found no significant SOC differences by group at baseline for any behavior.

Intervention Use

COACH use—Of 150 participants assigned to the COACH arm, 146 (97%) completed the initial assessment. Of assessment completers, 68% chose to work on diet, 76% chose to work on PA, 14% chose stress, and 3% chose smoking cessation. Of the 146 COACH participants who developed a plan with the coach, 42% (n = 62) chose to work on 1 behavior, 51% (n = 75) chose to work on 2 behaviors, and 6% (n = 9) chose to work on 3 behaviors.

Follow-up contact with participants in COACH included telephone calls, e-mails, and in-person visits. Of 688 total communications, 634 took place via e-mail, of which 491 (77%) were initiated by the coach. Contacts also included 48 follow-up telephone calls and 6 in-person follow-up visits. On average, the coach spent 9.25 hours per participant over the 12-month period.

RealAge use—Participants randomized to RealAge were told at the baseline interview how to access the RealAge Web site and complete the health-risk profile. Research staff sent 1 e-mail after the baseline interview to remind participants to access the Web site and complete all 7 sections of the RealAge healthrisk assessment. Of 135 participants assigned to RealAge, 79 (59%) completed all 7 sections of the RealAge test, which participants had to complete to gain unlimited access to the Real Age Web site. The 79 participants who completed the assessment received generic e-mail health tips from RealAge, which provided information on various health topics as well as links to additional information. Of the 79 engaged RealAge participants, 72 (94% of the engaged RealAge participants; 53% of the total RealAge group) clicked at least 1 link to obtain additional information. The remaining 60 participants who did not complete all 7 sections of the test did not receive e-mail health tips.

Outcomes

Diet—We found a significant 3-way interaction for both percentage of energy from fat and fruit and vegetable consumption, such that those in the COACH group who were in the precontemplation, contemplation, or preparation SOC had greater changes over time. COACH participants reported a borderline-significant reduction in percentage energy from fat at 6 months ($P = .063$) and a significant reduction at 12 months ($P = .027$ Table 1). COACH participants also reported eating significantly more fruits and vegetables than did control group participants at 6 months ($P = .026$) and 12 months ($P < .001$). No significant differences were seen on either variable for RealAge participants at either time point. Figure A (available as a supplement to the online version of this article at http://www.ajph.org) presents descriptive data for participants in precontemplation, contemplation, or preparation at baseline in each of the 3 groups at all 3 time points for percentage energy from fat. Consistent with the findings from the random-effects analyses, COACH participants experienced the largest decrease in percentage energy from fat, RealAge participants experienced more modest (nonsignificant) declines, and control participants stayed the same over the 12-month period.

Physical activity—COACH participants reported significantly more minutes of moderate PA than did controls at 6 months ($P = .05$) and 12 months ($P = .013$; Table 2). No significant differences were seen for COACH participants on RAPA scores or on minutes of vigorous PA at 6 or 12 months, and no significant differences were seen on any of the PA variables at either time point for RealAge participants.

Stress—No significant differences were seen for COACH or RealAge participants on any of the 4 stress outcomes at either time point (Table B, available as a supplement to the online version of this article at http://www.ajph.org).

Smoking—At 12 months, 2 of 16 COACH smokers, 4 of 16 RealAge smokers, and 3 of 21 control group smokers achieved maintenance of smoking cessation. We found no significant differences in rates of smoking cessation for smokers in COACH or RealAge relative to those in the control group with or without SOC for smoking at baseline as a covariate (data not shown). This finding probably reflects the small number of current smokers per group at baseline.

BMI, waist circumference, and weight—When we used baseline SOC for diet behaviors as a covariate, RealAge participants experienced a significant decline in waist circumference at 6 months ($P = .05$) that was maintained at 12 months ($P = .018$). Neither COACH nor Real Age participants experienced significant decreases in BMI or weight at 6 or 12 months compared with control participants (Table 3).

DISCUSSION

The ongoing shift in the age composition of the United States results from substantial advances in the treatment of infectious disease, heart disease, and stroke over the past century.[34] These advances in life expectancy will only constitute a public health triumph if they are accompanied by concomitant increases in active life expectancy and health-related quality of life.[35]

The workplace is an ideal venue for health-promotion efforts because of its potential for allowing interventions to reach large numbers of older adult workers efficiently.[36] If we can reach older adults while they are still working and engage them in sustained health-promotion activities, we may be able to delay morbidity onset, thereby reducing cost to employers as well as future Medicare expenditures. In the current study, we examined the impact of 2 promising health-promotion interventions on our growing population of older workers. The COACH intervention combined computerizedhealthrisk assessments with individualized, negotiated health-improvement action plans and ongoing support and reinforcement from a coach. By contrast, the RealAge intervention used an automated healthrisk assessment accompanied by participants' self-directed use of Web-based health modules and receipt of generic health e-mail tips.

We found important differences between the 2 intervention groups with respect to degree of program uptake. Whereas 97% of the COACH group underwent a baseline healthrisk assessment and completed a health action plan, only 57% of the RealAge group accessed the Web site and completed the risk assessment, and only 54% used the health tips. This difference in uptake may explain observed differences in outcomes.

Significant treatment benefits observed in the COACH group included increased consumption of fruits and vegetables and increased minutes of moderate PA at 6 months that were maintained at 12 months. COACH participants also experienced a borderline significant decrease in percentage of energy derived from fat at 6 months that became significant at 12 months. By contrast, RealAge participants experienced a significant decrease in waist circumference at 6 months that was maintained at 12 months. Overall, these findings indicate that the COACH intervention performed better than did RealAge at affecting both diet and PA outcomes, compared with a light health-education control group.

Certain study limitations should be noted. First, the COACH intervention was proactive, and the RealAge intervention was reactive, relying on the consumer to initiate follow-up; these inherent differences in approach may explain study findings. However, because the COACH intervention was both proactive and delivered by a person, it is also possible that the mode of delivery caused better outcomes. Unfortunately, our study design did not permit us to disentangle these 2 issues. Second, the interventions were tested with staff at an inner-city university who may have had higher levels of education than do workers in other industries. Thus, the generalizability of the findings to workers in other settings requires further testing. Third, we did not examine the comparative costs of the 2 interventions relative to their benefits. We plan to explore that issue in a future article.

Importantly, both of these interventions were light interventions in terms of intensity. The CDC Healthy People 2010 worksite wellness objectives called for 75% of worksites to offer comprehensive health-promotion programs by 2010. Comprehensive programs include health education, supportive social and physical environments, integration, linkage to related programs, and worksite screening. A 2004 national survey revealed that only 6.7% of worksites offered comprehensive programs, and large firms (more than 750 employees) were more likely to meet this challenge than were smaller firms.[37] The COACH and RealAge programs that we tested incorporated 3 of the components of a comprehensive program—health education, ongoing support from a health coach or generic e-mail health tips, and linkage to related programs—but they did so in a much less intense way than do many best-practice programs that are multifaceted.

For example, Milani and Lavie recently tested a worksite cardiac rehabilitation and exercise training program with younger workers (mean age 40 years).[38] The intervention included on-site health education, referrals to group smoking-cessation programs, stress management, a lipid clinic, physician referral for hypertension and diabetes management, substance-abuse treatment, and membership in local health and fitness centers. Weekly on-site classes provided education and counseling in nutrition, fitness, weight control, worksite and home safety, and general health topics. Awards were created for milestones in behavior change, including vacation days and free health-related premiums. Findings at 6 months included significant improvements in quality of life, behavioral symptoms, body fat, highdensity lipoprotein cholesterol, diastolic blood pressure, health habits, and total health risk.[37] The differences in the findings of our respective studies raises important questions about whether a dose–response relationship exists between comprehensiveness of services offered, and whether certain program components, such as incentives, are more effective and more critical than others.

Other important but unanswered questions concern the extent to which older workers who adopt healthy behaviors in the workplace are more likely than are others to practice these behaviors in retirement, as well as the attendant impact on retiree health expenditures and functional independence. Longitudinal studies of this question are urgently needed.

Our findings showed that COACH group participants were almost twice as likely to use their intervention as RealAge participants were to use theirs. COACH participants experienced 3 times as many positive outcomes as did RealAge participants at 6 months and 12 months for diet and PA, when both interventions were compared with a light health-education control. By contrast, no differences were seen in the RealAge group with respect to PA, but a significant decrease was seen in the important objective indicator of waist circumference. The fact that only 59% of RealAge participants completed the RealAge health assessment indicates a need for more sustained reinforcement to help workers engage in that program.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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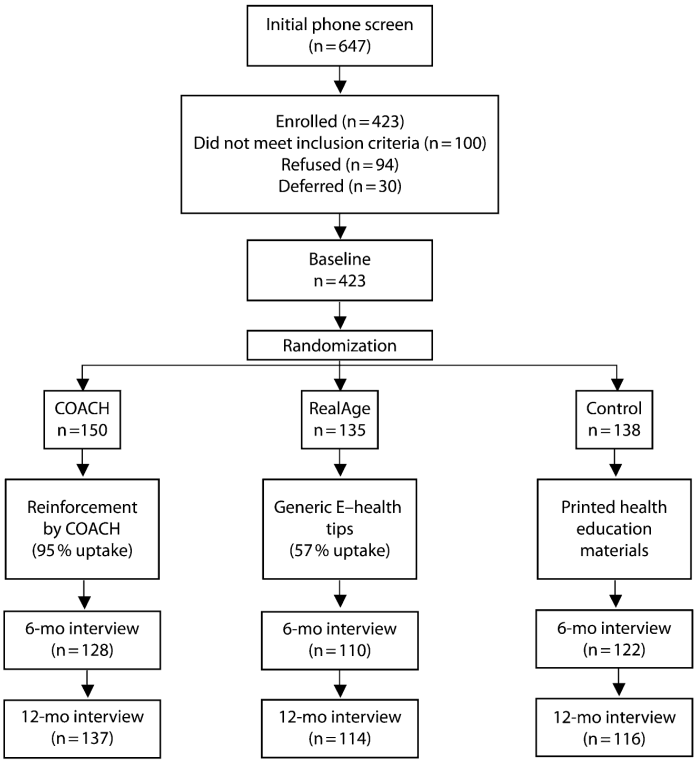

FIGURE 1.
Clinical flow diagram: assessment of COACH and RealAge, 2 worksite health-promotion interventions for older workers, Chicago, IL, 2006-2008.

TABLE 1

Diet Outcomes at Baseline, 6 Months, and 12 Months by Study Group: COACH and RealAge, 2 Worksite Health-Promotion Interventions for Older Workers, Chicago, IL, 2006–2008

	Percentage Energy From Fat			Fruit and Vegetable Consumption		
	Coefficient[a]	z	P	Coefficient[a]	z	P
Main effects						
COACH	0.479	0.60	.55	1.797	2.21	.027
RealAge	0.181	0.22	.829	1.453	1.70	.089
6 mo	−0.365	−0.64	.52	1.507	2.48	.013
12 mo	−0.168	−0.29	.768	2.232	3.57	<.001
2-way interactions						
COACH×6 mo	−0.239	−0.30	.761	−1.343	−1.60	.11
COACH×12 mo	−0.256	−0.33	.738	−2.870	−3.47	.001
RealAge×6 mo	−0.412	−0.50	.614	0.119	0.14	.891
RealAge×12 mo	−0.471	−0.58	.56	−2.043	−2.35	.019
Covariate: SOC for diet	3.335	3.89	<.001	−0.705	−0.82	.41
2-way interactions: time×SOC						
6 mo×SOC for diet	0.245	0.30	.768	−1.901	−2.15	.032
12 mo×SOC for diet	0.218	0.27	.789	−2.283	−2.57	.01
COACH×SOC for diet	−0.404	−0.34	.734	−1.565	−1.30	.194
RealAge×SOC for diet	0.123	0.10	.919	−1.291	−1.05	.292
3-way interactions						
COACH×6 mo×SOC for diet	−1.797	−1.53	.063	2.798	2.22	.026*
COACH×12 mo×SOC for diet	−2.187	−1.93	.027*	4.366	3.55	<.001*
RealAge×6 mo×SOC for diet	−0.729	−0.61	.539	−0.110	−0.09	.931
RealAge×12 mo×SOC for diet	−1.543	−1.32	.186	1.541	1.23	.22

Note. SOC = stage of change.

[a]Unstandardized regression coefficient.

*$P < .05$, 1-tailed test.

TABLE 2

Physical Activity Outcomes at Baseline, 6 Months, and 12 Months by Study Group: COACH and RealAge, 2 Worksite Health-Promotion Interventions for Older Workers, Chicago, IL, 2006–2008

	RAPA			Minutes of Moderate Activity			Minutes of Vigorous Activity		
	Coefficient[a]	z	P	Coefficient[a]	z	P	Coefficient[a]	z	P
Main effects									
COACH	0.021	0.12	.901	0.199	0.68	.499	−0.222	−0.73	.463
RealAge	0.102	0.59	.555	−0.154	−0.51	.611	−0.135	−0.43	.664
6 mo	0.131	0.84	.399	−0.004	−0.02	.987	0.496	1.64	.102
12 mo	0.206	1.30	.193	0.267	0.97	.33	0.385	1.25	.212
2-way interactions: group×time									
COACH×6 mo	−0.032	−0.15	.883	−0.368	−0.98	.325	0.209	0.50	.618
COACH×12 mo	−0.019	−0.09	.928	−0.488	−1.32	.187	−0.068	−0.16	.87
RealAge×6 mo	0.108	0.49	.627	−0.099	−0.26	.798	−0.269	−0.62	.536
RealAge×12 mo	−0.148	−0.67	.504	0.035	0.09	.928	−0.311	−0.72	.472
Covariate: SOC for PA	−1.491	−9.06	<.001	−1.625	−5.63	<.001	−0.918	−3.11	.002
2-way interactions: time×SOC									
6 mo×SOC for PA	0.415	1.92	.055	0.572	1.53	.126	−0.281	−0.67	.502
12 mo×SOC for PA	0.204	0.93	.354	0.184	0.48	.63	−0.070	−0.16	.87
COACH×SOC for PA	0.342	1.51	.132	−0.024	−0.06	.953	0.056	0.14	.891
RealAge×SOC for PA	0.024	0.10	.919	0.377	0.92	.359	0.099	0.24	.812
3-way interactions									
COACH×6 mo×SOC for PA	−0.182	−0.61	.541	0.849	1.64	.05*	0.327	0.57	.571
COACH×12 mo×SOC for PA	0.198	0.67	.505	1.149	2.22	.013*	0.641	1.11	.266
RealAge×6 mo×SOC for PA	−0.395	−1.28	.2	0.337	0.63	.53	0.419	0.70	.482
RealAge×12 mo×SOC for PA	−0.047	−0.15	.879	0.108	0.20	.84	0.283	0.47	.635

Note. PA = physical activity; RAPA = Rapid Assessment of Physical Activity; SOC = stage of change.

[a]Unstandardized regression coefficient.

*$P < .05$, 1-tailed test.

TABLE 3

Outcomes at Baseline, 6 Months, and 12 Months for BMI, Waist Circumference, and Weight, With SOC for Diet, by Study Group: COACH and RealAge, 2 Worksite Health-Promotion Interventions for Older Workers, Chicago, IL, 2006–2008

	BMI			Waist Circumference			Weight		
	Coefficient[a]	z	P	Coefficient[a]	z	P	Coefficient[a]	z	P
Main effects									
COACH	0.318	0.29	.771	0.732	0.61	.542	4.492	0.62	.536
RealAge	−0.157	−0.14	.89	−0.335	−0.26	.792	2.083	0.28	.783
6 mo	0.010	0.05	.963	−0.082	−0.27	.79	0.418	0.34	.732
12 mo	0.105	0.45	.652	−0.676	−2.09	.036	1.282	1.00	.318
2-way interactions: group×time									
COACH×6 mo	0.133	0.43	.667	0.191	0.45	.656	0.099	0.06	.954
COACH×12 mo	−0.354	−1.12	.263	0.226	0.53	.597	−2.514	−1.46	.146
RealAge×6 mo	−0.040	−0.13	.9	0.122	0.28	.783	−1.517	−0.86	.391
RealAge×12 mo	−0.060	−0.19	.853	0.278	0.62	.535	−1.959	−1.10	.272
Covariate: SOC for diet	3.003	2.60	.009	3.642	2.88	.004	21.255	2.78	.005
2-way interactions: time×SOC									
6 mo×SOC for diet	0.115	0.35	.725	0.348	0.77	.443	0.151	0.08	.933
12 mo×SOC for diet	0.148	0.44	.658	0.297	0.64	.52	−0.156	−0.80	.932
COACH×SOC for diet	−1.938	−1.20	.228	−3.459	−1.95	.051	−20.378	−1.92	.055
RealAge×SOC for diet	0.251	0.15	.88	1.698	0.93	.351	−1.653	−0.15	.88
3-way interactions									
COACH×6 mo×SOC for diet	−0.454	−1.00	.318	−0.877	−1.36	.174	−0.906	−0.36	.719
COACH×12 mo×SOC for diet	−0.440	−0.96	.339	−0.973	−1.51	.13	−0.845	−0.33	.739
RealAge×6 mo×SOC for diet	0.063	0.13	.895	−1.073	−1.65	.05*	2.308	0.87	.382
RealAge×12 mo×SOC for diet	−0.056	−0.12	.907	−1.370	−2.11	.018*	1.513	0.58	.564

Note. BMI = body mass index; SOC = stage of change. BMI was defined as weight in kilograms divided by height in meters squared.

[a]Unstandardized regression coefficient.

*$P < .05$, one-tailed test.